

The Role of Age and Gender in the Outcomes of Non-surgical Periodontal Therapy

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AIM

The goal of the present study was to conduct a large-scale epidemiological analysis of the role of age, gender, and selected local and systemic contributory and risk factors in the outcomes of non-surgical periodontal therapy (NSPT). Our null hypothesis stated that older adults and men would have poorer clinical outcomes of periodontal therapies as compared to those in younger adults and women, respectively.

METHODS

Study design: This was a large-scale retrospective study. The Institutional Review Board of the University of Texas Health Science Center at Houston (UTHealth, Houston, TX, USA) has granted the approval to conduct the proposed study (protocol #HSC-DB-18-0663).

Study population: De-identified data of patients attending dental clinics at the UTHealth School of Dentistry were extracted from the University's axiUm® database (Henry Schein, Melville, NY, USA) and exported in standardized extraction spreadsheets.

Inclusion criteria: (i) individuals ≥ 18 years old; (ii) women and men of all reported races/ethnicities (African-American, Asian, Caucasian, Hispanic, and Others); (iii) ASA status 1 and 2; (iv) dentate (≥ 2 remaining teeth); (v) completed periodontal charts containing information to allow for an accurate data analysis, and (vi) history of non-surgical periodontal therapy (scaling and root planing, SRP) and a timely (4-6 weeks post-treatment) re-evaluation visit (perio maintenance??). Both SRP and re-evaluation visits were identified by the completion of the respective Code on Dental Procedures and Nomenclature (CDT) codes (D4341/D4342 for SRP and D4132 for re-evaluation).

Patient's age, gender, and race/ethnicity were classified based on their respective self-reported status recorded in medical and dental forms in axiUm. We considered individuals of 18-34, 35-64, and ≥ 65 years of age as young, middle, and old patients, respectively. The diagnosis of periodontitis was defined (according to the 2017 Classification of Periodontal and Peri-implant Diseases and Conditions) by the presence of interproximal CAL in ≥ 2 non-adjacent teeth or ≥ 3 mm buccal or lingual CAL in ≥ 2 teeth associated with inflammatory, periodontal breakdown (Tonetti et al. 2018). This diagnosis includes localized and generalized periodontitis stage I (initial periodontitis), stage II (moderate periodontitis), and stage III/IV (severe periodontitis with potential for additional tooth loss or loss of the dentition) (Caton et al. 2018; Papapanou et al. 2018).

Exclusion criteria: individuals who do not meet the above-mentioned inclusion criteria.

Variables: The following variables were extracted from the axiUm® database: demographics characteristics (patient's age, gender, race, BMI), periodontal (maximum and minimum, values of PD and CAL (PD_{max} , PD_{min} , CAL_{max} , and CAL_{min} , respectively), the percentage of BOP, and FGM-CEJ values). The primary outcome was defined as the differences (Δ) in the reduction in PD and CAL between different age, gender, and race/ethnicity after the adjustment for possible confounding factors.

RESULTS

Variable	Percentage (%)
Age	
Young	29.15
Middle	48.7
Old	22.14
Gender	
Women	57.34
Men	42.66
Baseline PD (bPD, mm)	
4	6.4
5	26.11
≥6	67.48
Mean bPD	0.62
Missing teeth	5.71
Diabetes mellitus	
No	84.09
Yes	15.91
Smoking	
No	79.1
Yes	20.9

Table1. Demographic characteristics of the participants

Variable	Women				Men			
	Young (<i>n</i> = 509)	Middle (<i>n</i> = 899)	Old (<i>n</i> = 376)	<i>P</i> -value	Young (<i>n</i> = 397)	Middle (<i>n</i> = 618)	Old (<i>n</i> = 314)	<i>P</i> -value
bPD (mm)				0.0158				0.0364
4	30 ± 24.39	52 ± 42.28	41 ± 33.33		19 ± 24.36	39 ± 50	20 ± 25.64	
5	144 ± 29.39	245 ± 50	101 ± 20.61		117 ± 36.34	129 ± 40.06	76 ± 23.60	
≥6	335 ± 28.61	602 ± 51.41	234 ± 19.98		261 ± 28.09	450 ± 48.44	218 ± 23.47	
Missing teeth (n)	5.08 ± 4.20	8.06 ± 5.62	9.27 ± 5.87	<0.0001	4.46 ± 3.77	8.14 ± 6.06	9.87 ± 6.58	<0.0001

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	Young (<i>n</i> = 509)	Middle (<i>n</i> = 899)	Old (<i>n</i> = 376)	<i>P</i> -value	Young (<i>n</i> = 397)	Middle (<i>n</i> = 618)	Old (<i>n</i> = 314)	<i>P</i> -value
rPD (mm)				0.1678				0.0002
<4	31 ± 6.83	48 ± 5.94	19 ± 5.64		12 ± 3.32	29 ± 5.22	11 ± 3.86	
4	113 ± 24.89	185 ± 22.90	92 ± 27.30		87 ± 24.10	122 ± 21.94	60 ± 21.05	
5	152 ± 33.48	235 ± 29.08	93 ± 27.60		124 ± 34.35	119 ± 21.40	69 ± 24.21	
≥6	158 ± 34.80	340 ± 42.08	133 ± 39.47		138 ± 38.23	286 ± 51.44	145 ± 50.88	
Mean	2.79 ± 0.41	2.81 ± 0.47	2.75 ± 0.47	0.0822	2.88 ± 0.47	2.91 ± 0.53	2.93 ± 0.51	0.3889
Δ (rPD - bPD)	0.37 ± 0.39	0.34 ± 0.42	0.28 ± 0.38	0.007	0.36 ± 0.4	0.36 ± 0.45	0.3 ± 0.42	0.1112

Table 2. Age- and gender-associated prevalence of PD at the baseline (top) and re-evaluation (bottom)

RESULTS

Comparison	PD
Age <ul style="list-style-type: none">•Middle vs. young•Old vs. young	
	OR 0.604 (95% CI 0.48-0.759)
	OR 0.626 (95% CI 0.469-0.873)
Gender (women vs. men)	OR 1.454 (95% CI 1.191-1.775)
Diabetes Mellitus (no vs. yes)	OR 0.915 (95% CI 0.699-1.197)
Smoking (no vs. yes)	OR 0.933 (95% CI 0.729-1.192)

Table 3. Age- and gender-associated prevalence of 5mm PD at the re-evaluation.

SUMMARY OF THE RESULTS

- There was a significant age- and gender-associated prevalence in PD at the baseline.
- At re-evaluation, the prevalence of periodontal pockets was not statistically significant in women but in men.
- The difference in PD between re-evaluation and baseline (Δ) was statistically significant only in women but not in men.
- Young individuals and women had greater probabilities to have residual 5mm PD as compared to older individuals and men, respectively.
- **These results suggest that although periodontitis has age- and gender-associated prevalence, age should not be considered a risk or contributory factor for periodontitis. However, women may be at the higher risk for the progressive periodontal disease after periodontal treatment.**

CONCLUSIONS

Older adults and men attending academic dental clinics displayed more compromised outcomes of NSPT as compared to younger adults and women, respectively. The outcomes of this study will allow for the development of personalized strategies for improved outcomes of periodontal therapies in older adults and men.

FUTURE DIRECTIONS

We aim to conduct a large-scale epidemiological study using a BigMouth dental repository that includes data from several U.S. dental schools. We also aim to conduct a prospective randomized controlled study to examine the role of age and gender in the outcomes of NSPT using personalized treatment protocols.

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